3

A COURSE OF LECTURES

ON

HYDROPHOBIA;

ITS HISTORY, PATHOLOGY, AND TREATMENT,

Compiled from Manuscript Notes of the late Dr. T. S. Holland,

DELIVERED IN THE THEATRE OF THE

NORTH CHARITABLE INFIRMARY

AND

CITY OF CORK GENERAL HOSPITAL.

ROYAL COLLEGE OF SURGEONS OF ENGLAND

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A COURSE OF LECTURES ON HYDROPHOBIA.

LECTURE I.

Gentlemen,—A special course of lectures, no matter what the subject, always excites large expectations of completeness.

The critic looks for at least a thorough analytical review of the literature of the subject, and a collection and arrangement of the facts accumulated therein; and if it be a purely *scientific* question, he anticipates also a weighing of modern views and a trial of them by experimental researches; whilst, if it be a purely *practical* question, he, with reason, hopes to have it thoroughly elucidated, not only by bibliographical inquiries into accumulated experience, and by scientific researches, but also by enlightened observation, based on a thorough knowledge of anatomy, and physiology.

How serious and laborious, then, is the task I have proposed to myself, in the compilation of these lectures from the MS. of my friend, the late Dr. Holland of this city. How honourable will it be for me, at their conclusion, to obtain that which all teachers look on as their highest reward, the approbation and approval of the taught.

Whatever may be the result, I will have the satisfaction of feeling that neither time nor labour has been spared in their composition, and I feel assured that you will not consider either the time or labour expended unwisely, when the object was to advance truth and to confer benefits on our fellow-man. We must bear in mind that, "There are mites in science as well as charity; and the ultimate results of each are often alike important and beneficial." We must also remember that, "Facts are the morality of medicine; they are the same in all ages and throughout all time." These lectures are my mite to science; the facts contained in them my offerings to the morality of medicine.

We commence the consideration of hydrophobia by enumerating for you the people who have a term in their language expressive of this disease,—without this list, the history would be incomplete:—

Hebrew, Arabic, and Chaldaic	Kelev (dog) schote (mad.)
Greek	*Λύσσα* and its compounds, later *υδροφοβια*.
Latin	Hydrophobia (*ὑδωρ* and *φοβος*).
English	Hydrophobia. and in the dog canine madness.
Spanish	Hidrofobia and Mal de rabai.
Italian	Idrofobia and rabbia canina.
French	Hydrophobie and La Rage.
German	Wasserschen and Hundswuth.
Hollandish	Watervress and dolheit der honden.
Swedish	Vallenskrack and raseri af hundbette.

Norwegian and Danish . .	Vandsky.
Russian	Byechenstvo ?
Servian	Byesnania.
Polish	Wscieklizna.
Bohemian	Weleklost.
Hungarian	Viziszony und Verzesseg.
Persian and Turkish . .	Sag dīwānah.
Modern Greek . . .	λύσσα and ὑδροφοβία.
Maltese	No word for hydrophobia in this language.

Entering on an inquiry into the antiquity of a disease, the first question that naturally suggests itself is—

1st. At what period it took its origin?

In order to determine which, we must refer to the words used in other languages, for the disease called in English hydrophobia, and we learn from the list that heads this division of the subject that the Eastern people, including the Hebrews, Chaldeans, Arabs, Persians, and early Greeks had no word whose formation derived its origin from the idea that there existed any connexion between the bite of an animal and disease occurring in man. That these nations were at some time aware of the existence of the disease of madness in dogs, is proved by the use of the words kelev (dog) schote (mad) among the three former, and of sag (dog) diwanah (devilish or bewitched) by the Persians, and later by the Turks, to express this affection; but there is no record of the period in which this combination of words was made.

Reasoning, however, on probabilities, it would appear that, as the main features in the character of the dog have, although more or less modified by breeding, domestication, &c., been originally what they are at the present day; and, as we shall hereafter be enabled to prove, that the complete exemption from madness which the dogs of particular countries, as Turkey, &c., have been by almost all authors said to enjoy, is not borne out by facts, there appears to be good reason for concluding, that the dog has been since his creation subject to madness, and from his ever existing close relations with man, it follows that man has during all ages been liable to the effects resulting from the bite of the mad dog. Further, it will be hereafter shown, that wolves in their wild, and cats and foxes, at least in their tame state, are liable to and can transmit the disease to man. This tends to confirm the opinion, that dogs and wolves at least have, from time immemorial, become mad, and that man, whose liability to disease appears to have remained unaltered, has been always one of the recipients of that disease.

2ndly. At what period was madness first recognized in animals? The death of Acteon has been considered by Sprengel to contain an account of a case of hydrophobia that derived its origin from this myth. According to Horappola, the famous decipherer of the hieroglyphics, the Egyptians were aware of its existence; and the Athenians are stated to have had a feast at Argos, called Cynophantes, during which time all the dogs that were found were destroyed.

The passage in the 8th Book, verse 299, of the Iliad, where Teucer speaks of Hector under the name of *κυνα λυσσητηρα*, or mad dog, is quoted by Cœlius Aurelianus as proof of the disease having been known at the time of Homer; but as in Book ix., verse 239, the word *λυσσα* is used to imply the fury of Hector, and at Book xiii., verse 53, *λυσσωδης* expresses Hector's being enraged, or full of vengeance. This and similar passages do not even so much as imply that true canine madness was known when this poem was composed, though this opinion is opposed to that of St. Martin, who considers that these passages prove that Homer was aware of the disease in the dog.

However, it would appear that the disease was known at the time of Socrates, who died 399 years B.C., as Xenophon, the pupil and contemporary of Hippocrates, observes in a speech to the soldiers,* that although they (the Cerasuntians) had not been guilty of any crime, they feared, lest, like dogs, they should become enraged. Further, the following passage proves that Aristotle, who lived about 336 years B.C., was well acquainted with the disease in animals: "Canes tribus laborant vitiis; rabie, angina, podagra; facit rabies furorem, et quæ momorderint animalia, omnia, homine excepto, furunt. Intereunt canes hoc morbo, et quæ morsæ sunt, excepto homine." From these reasons, together with others to be hereafter given, it appears to be proved that canine madness was known to occur in animals about 400 years B.C.

3rd. At what period was the disease known to be transmissible to, and occur in, man?

This question involves the inquiry of, when the word *ὑδροφοβια* was first used, and most modern nations have either adopted the Greek word, or translated it into their language, as in German, Swedish, &c. The works of Hippocrates, being the most ancient we possess, have been carefully examined by many of the authors who investigated this subject, and some suppose that he had unconsciously described this disease, although confounding it with mania or angina, under which name Hippocrates treated of all diseases in which delirium was a prominent symptom, when he observed,* "phrenitici parum bibunt, ex levibus strepitibus facile irritantur ac percelluntur, tremuli sunt." After referring to this and other passages that are mentioned in the note, M. St. Martin, among others, concludes that Hippocrates had never seen a case of hydrophobia, or if so, he confounded it with mania.

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* The general character of this passage is so forcible that we give the Greek from Hutchinson's Xenophon, Anab. lib v., page 409, edit. quart. Cantab. 1785:—"*ἠδίκουν μὲν οὐδὲν, ἔδεισαν δὲ μὴ λύσσα τις ὥσπερ κυσὶν ἡμῖν ἐμπεπτώκοι.*" "They (the Cerasuntians) did no injury, but feared lest a sort of madness (*λύσσα τις*) had seized us as if dogs."

Cœlius Aurelianus, whose works are the most ancient we possess, in which the word *υδροφοβια* is used, states that Democritus, who lived about 400 years B.C., described the seat and treatment of hydrophobia, and gave his opinions concerning it; and as Dr. Hecker, in his "Researches into the History of Hydrophobia," observes, the works of Democritus must have existed at the time of Aurelius, or at least in that of Soranus, who lived under the Emperors Trajan and Adrian, and was Aurelius' predecessor in the methodical school, and this Soranus probably completed the eight books that have come down to us out of Democritus' works. The nervous system was, in the opinion of Democritus, the seat of the disease, and he was led to this conclusion from the phenomena of convulsions and priapism occurring in it. The passage is—"Equidem Democritus quum de emprosthotanicis diceret, nervos (pati?) inquit, conjiciens hoc ex corporis conductione atque ventri tentigine;" in another place, he even specifies that it is an inflammation of the nerves: "Ait enim hydrophobiam esse incendium nervorum," and proceeds to direct a treatment. It has been objected that if this account of Democritus having written on hydrophobia was correct, Hippocrates would not have omitted mentioning the existence of such a disease and calling it by name; but, as it was the habit of the Father of Medicine to describe only what he saw, and rarely or never to refer to the opinions of others, it may have readily occurred that he never had seen the disease, and therefore did not, perhaps, even so much as believe in its existence. It has been again and again observed, that if the disease had been known at the time of Aristotle, he would not have remarked that man was the only animal who was not liable to be infected; but this may, perhaps, be explained by the rarity of the disease in man at all times, and particularly at a period when the artificial position in which the dog is, as a result of civilization, placed, and thereby predisposed to the disease, was not so complete as at the present day, and as a sequence canine madness must have been of less frequent occurrence than in our times.

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* The Greek of this passage is—viz., "Oi *φρενιτιχον βραχυπόται, ψοθον καθαπτόμενοι, τρομώδεες.*" "Phrenitics (probably including all cases in which fever, accompanied by delirium, formed a prominent symptom), drink little, are affected by noise, are tremulous." *'Ιπποκρατοι Προγνωστικον βιβ.*

Further, man is by no means very predisposed to receive this disease, and it may have happened that Aristotle having seen dogs die from the bite of an animal that had also bitten men who *did not* become diseased, this appeared to him so remarkable, that he considered it as a rule that man alone was exempt from it.

The interval between the bite and its effects being much longer in man than in animals increased the difficulty of tracing any connexion between them, while the distinction that was considered to exist between man and animals was so great, that Aristotle and his school most probably believed it impossible for disease to pass from one to the other, or *vice versa*.

There appears, then, to be but little doubt that the disease existed from the earliest ages, that man has been ever liable to this disease, and that its transmissibility to man appears to have been known as early as 400 years B.C.

We must look to Cœlius Aurelianus for the names of those who wrote on this subject during the three hundred years between Aristotle and him, and we find mention of Artemidorus, Caridemus, and Andreas, who gave it the name of *κυνολυσσος*; he is further referred to by Aurelianus relative to the diagnosis of hydrophobia from pahtaphobia. Aurelianus and Galen mention the names of Gaius, Asclepiades, Themisius, and Heras Cappadocus, as having written between the time of Andreas and Celsus. There is also a certain Demetrius referred to who considered that hydrophobia might become chronic.

It is unnecessary to lengthen this section with a notice of those who have written upon this subject since the time of Celsus. Their opinions are only interesting in respect to the different treatments they recommended, their names will be found under the remarks on treatment. We, therefore, pass on to glance at the Arabian authors. In the year 800 of our era, Mesus, or, according to Prof. Seligmann of Vienna, Masawaih of Bagdad translated and commented on the works of the ancients, and to him succeeded Ebn. Honain, surnamed the Interpreter. Rhazes, who lived in the tenth century, described a particular kind of hydrophobia which he had seen. Avincennus and Abenzoar lived and wrote on this subject in the eleventh century, while the second Masawaih, Ebenbilar, and Serapion wrote in the twelfth, to the last of whom we owe the best account of the opinions and writings of the Arabs on this disease.

The opinions of the Hebrews are to be found in their

"Talmud Tractus, Juma," cvii., fol. 80 ab., and will be alluded to in their proper place.

Our next consideration is to institute an inquiry respecting the animals in which madness arises; to consider its propagation, the influence of geographical position, climate, &c., on its development, and the cause of the disease in animals and man.

These form, as it were, so many distinct chapters in the general history of the disease; they will therefore be best considered by proposing a series of questions which have been used for a similar purpose by many authors.

1st. In what animals does madness occur spontaneously? This question has been variously answered by authors, but we will see that in 120 cases of hydrophobia caused by 117 animals, in almost all of whom there is no account of the animals having been bitten by others, the disease occurred in dogs, wolves, cats, and foxes; but there is no case on record in which madness arose spontaneously in horses, asses, oxen, pigs, bears, weasels, monkeys, cocks, &c., in whom it has been stated to occur by Aurelianus, Avincennus, Fernel, &c.

The possibility of this affection presenting itself spontaneously in man will form the subject of a separate chapter.

2nd. What animals can propagate the disease to man, or to other animals?

The bites of 96 dogs, 12 wolves, 7 cats, and 2 foxes, caused true hydrophobia to occur in 120 cases. For the accuracy of these cases I consider myself responsible. Still, it is necessary to mention some of the rarer forms of transmission that have occurred between animals, or from them to man; and in this, as well as in the succeeding pages, reference will, as a general rule, be made only to such cases as have *not hitherto been recorded* in any of the well-known and easily accessible monographs, or in articles, in dictionaries, cyclopædias, &c., on this subject, thereby avoiding the error made by most authors on hydrophobia—namely, the repetition of observations that have been handed down from one to the other without adding to them by original observations or new researches.

Dr. Heyfelder in his article, observes, that a bull was bitten by a mad fox, became affected with the disease, and died.

Dr. Molitor records a case of madness that occurred in a five months' old calf, who was bitten three weeks before by a mad cat, but this cannot be considered as a true example, as the calf is said to have died fourteen days after the commencement of the symptoms. Examples of the disease which have been transmitted from the dog to horses are also on record.

Prof. Berndt of Greisswald has seen transmitted hydrophobia once in the horse, twice in sheep, four times in pigs, and repeatedly in oxen.

Dr. Jankowich reports two cases of madness in horses caused by the bite of a dog.

A great number of cases occurred in July, 1829, at Seafield, where sixty cows with ten calves, and in the town of Seba eleven other cows—in all eighty-one heads of horned cattle—died of madness resulting from the bites of two mad dogs.

Dr. Stratton reports that a mad fox bit two pigs who both died of the disease.

Mead gives the case of a young man, aged 18, who was bitten on the back of the hand by a mad fox that had been previously bitten by a mad dog.

Layard mentions that a mad dog had bitten eight cows, most of them in calf, and two sows with young, all of whom died mad.

Portal states that a child, aged five years, died of hydrophobia that was caused by the bite of a hare, and a child that had been bitten by a badger became attacked with the disease, and died on the thirty-second day from the receipt of the injury.

There is, therefore, from these cases and a great number of others, reason to conclude that the disease may, and has been transmitted—

1st. From dogs to cats, oxen, foxes, pigs, and sheep.
2nd. From dogs to foxes, and through them to man.
3rd. From dogs to cats, and through them to man.
4th. From wolves to man.
5th. From cats to man.
6th. From foxes to man.
7th. From foxes to pigs and oxen.
8th. From cats to dogs, and from the latter to man.
9th. From the badger to man.
10th. That the disease as it occurs in man is generally communicated to him from dogs, wolves, cats, and foxes.

3rd. Can hydrophobia after being communicated to man, be transferred from him to his fellow-man or to animals?

The great importance of determining this question justifies noticing at some length all cases relating to this inquiry. Gauthier, Vaughan, and Babington have failed to communicate the disease by inoculation from man to animals. Bosquillon states that Giraud, one of the surgeons to the Hôtel Dieu at Paris, failed in several experiments made in a similar manner. Girard of Lyons has been equally unsuccessful. Paroise failed to inoculate it in three dogs, and M. Bezard also failed.

To the honour of M. Caillard of Hôtel Dieu it is recorded that he was bitten in 1814 by a hydrophobic man, whom he, unaided, courageously succeeded in securing after all the attendants had fled. In 1831 he was a second time bitten while taking a piece of meat from the back of the pharynx of a child labouring under hydrophobia, and whose life was thereby prolonged a few hours; in both cases the bite was cauterized with a hot iron, and no ill consequences followed.

M. Sandras states that to his knowledge M. Caillard was bitten three times, and never took any but the most simple precautions against the probable consequences. He further states that many physicians, among whom was Dr. Bally, were known to him to have wounded themselves while making autopsies on those who died of the disease, yet none suffered from the wounds, though they used no preventive beyond washing the wound.

A woman, aged 17, who ultimately died of the disease, bit a surgeon who brought her out of the street, whither she had fled, yet no bad consequences resulted.

Finally, Dr. Rohatsch of Munich inoculated a King-Charles dog with the saliva of a hydrophobic man, by making a wound in the mucous membrane of the left side of the jaw, and the animal remained perfectly healthy.

On the other hand, the experiments reported in many journals, and lately given in detail by M. Breschet, is to the effect, that in 1813 linen rags were soaked in the saliva of a man while in one of the last hydrophobic paroxysms that preceded his death, which occurred in the Hôtel Dieu. The cloths, thus saturated with saliva, were laid in a wound made on the back of two dogs. On the

28th July, thirty-eight days after the inoculation, one of these animals was seized with furious madness, and was then made to bite many other dogs, one of whom, at the expiration of a month, became mad, and all the others became successively enraged ("et tout les autres devinrent successivement enragés"). It is certainly curious, if not inexplicable, that *all the dogs* bitten by this particular animal became mad, as in all other experiments only a certain number, and that the minority of the animals bitten, became affected with the disease; thus in Professor Hertwig's elaborate experiments, of fifty-nine dogs inoculated with the saliva of rabid dogs, only fourteen became attacked with rabies, or about one in every four, and Hertwig concludes from the result of his investigations, that the application of saliva to a fresh wound appears to be as frequently followed by rabies as when the animal has been bitten.

Hence this isolated, and as we have shown rather doubtful, experiment cannot be considered sufficient to prove that the disease is communicable from man to animals, while all the cases on record go to prove that hydrophobia is not communicable from man to man.

4th. Can hydrophobia result from the bite of a man or animal who is not labouring under that disease?

The so-called case of hydrophobia occurring in a woman who was bitten by her daughter while the latter was in an epileptic fit; the case resulting from a man having in a paroxysm of violent anger bitten his own finger; that, recorded by Le Cat, of a person who died after having been bitten by a duck whom he removed from the female;—these and other examples given in the article "Rage Dictionnaire des Sciences Médicale," and in "Portal's Monograph," are evidently not examples of hydrophobia, as the interval between the injury and the occurrence of the symptoms is much too short.

But in reference to the possibility of a disease resulting from the bite of a dog who at the time of, and for several months after, inflicting the bite was in good health, it is to be observed that, M. Velpeau reported to the Société Médicale d'Emulation the case of a boy who, while in perfect health, was bitten by a dog with which he was playing. The bite was treated by the author as if it had been an ordinary wound, as there was no reason to believe that the animal was in any way ill. On the twenty-sixth day from the injury the boy died, with what M. Velpeau considered to be the symptoms of hydrophobia, yet the dog never presented any signs of departure from health, and was killed on the day the patient died. In the *Lancet* is reported a fatal case of hydrophobia that in five months succeeded the bite of a dog whom the deceased and others had been irritating. The animal was alive and well at the time of the patient's death.

These and similar cases *oblige us* to come to the conclusion that the bites of non-rabid dogs, even though they may not have been ill previous to or after the infliction of the injury, can in some rare cases, and under circumstances which tend to excite their anger, produce true hydrophobia in man.

5th. Does geographical position, climate, or the season, exercise any influence on the frequency of spontaneous madness in animals?

It has been asserted by almost all authors that dogs in Egypt, Turkey, Algiers, and parts of America, as Mexico, are exempt from madness, and this has been explained by many suppositions, particularly by reference to the fact of the animals being allowed to wander about in an almost wild state, and it has been argued that domestication must be considered to be the chief cause of this disease.

M. Prus, Medical Director of Sanitary Regulation at Alexandria, in a letter to the Académie de Médecine de Paris, reports that hydrophobia is of much more frequent occurrence in Egypt than is generally believed, as M. le Dr. Pruner Bey has seen a case at Cairo in a boy aged 16, knew of two other cases that occurred in the same town, and of one at Galiomb, all of which resulted from the bites of rabid dogs. M. le Dr. Geatani Bey has observed two other examples of this affection at Cairo. M. le Dr. Farfara has treated many cases at Behera, and soon after the Director arrived at Alexandria in 1847, there occurred a case of hydrophobia from the bite of a cat, and another in the child of an Attaché to the English Consul who had been bitten by a rabid dog, and died on the thirty-fifth day from the reception of the injury, the symptoms of hydrophobia having existed three days.

These cases are sufficient proof of the disease occurring not unfrequently in Egypt, yet M. Clot Bey states, that the disease is exceedingly rare in this country, as in his twenty-five years' residence in Egypt he had never seen a case, and he refers the supposed rarity of the affection to the non-domestication of the dog. But how many practitioners of twenty-five years' standing are there in this country who have also never had an opportunity of witnessing an instance of this disease?

As regards Algiers, a case of fatal hydrophobia has been observed in the city by M. le Louis, Military Surgeon on duty in Africa, it occurred in an Arab who had never heard of the existence of such a disease, and was caused by the bite of a rabid dog.

An instance of madness in a horse which had been bitten by a mad dog presented itself at the bivouac of the French army at Hanif, and M. Guyon records two cases similar to the last mentioned which he observed in Algiers.

Dr. Dawson refers to four well-authenticated cases of this disease that occurred at Malta (one of which has been recorded by Mr. Wells) in 1847; while during forty-seven years only two such cases had taken place on the Island, and these presented themselves in 1805. Mr. Wells informed Dr. Holland that the four cases were the result of the bites of animals that had been bitten by a dog who arrived in an English vessel about the Christmas of 1846, and it will be seen by reference to the beginning of the lecture that there is no word for this disease in the Maltese language.

The existence of the disease in Mexico is fully proved by the fact that there are certain remedies much relied on by the inhabitants for protecting from hydrophobia those bitten by rabid animals.

From these observations it is evident that madness occurs in the dogs of all countries, though less frequently, where they are allowed to stray unrestrained, and are thereby removed from such circumstances as tend to develop a highly sensitive state of their nervous system, which predisposes them to the disease; hence lap-dogs are particularly liable to be attacked with madness, while watch-dogs, shepherds' dogs, those used for the chase, &c., are but rarely attacked.

The influence which climate exercises on the spontaneous production of madness has been variously stated by authors. Boerhaave, James Sauvages, &c., considers that sudden alternations from heat to cold acted as a predisposing cause, and extreme heat and cold has been supposed to cause indirectly the disease in wolves, by rendering their food scarce in winter and putrid during summer. The frozen state of water in the former and its scarcity in the latter season has also been stated to give origin to madness.

Barrow, in his travels in the interior of the Cape of Good Hope and Caffraria, where the dogs are fed upon putrid flesh, states that hydrophobia is unknown. According to Hunter it is rare in Jamaica, while Hillary in his work "On the Diseases of Barbadoes," says it is epidemic there, and in the article "*Rage*" above referred to, and from which many of these latter quotations are taken, Dupuytren, Magendie, and Breschet are reported to have been unable to produce madness in dogs by allowing them to die of hunger and thirst.

Audry gives it as the result of his researches, that in January and August, which are generally the coldest and warmest months of the year, canine madness occurs least frequently, while in May and September it is most frequent in dogs, and in wolves in March and April.

Dr. Stranton of Canada, reports that this disease is very rare in summer, but in the winter many foxes become mad, which he refers to the ice acting as barriers between them and their supply of water, and he argues that if this affection was caused by heat many cases would present themselves in summer when the thermometer stands at 86° Fahr.

Of 95 cases of madness in dogs, all of whom had transmitted the disease to man, the frequence in each month and in the seasons was as follows :—

In Dogs.	In January	4	cases of canine madness occurred.
	February	7	
	March	9	20 in spring.
	April	8	
	May	8	
	June	12	28 in summer.
	July	11	
	August	6	
	September	5	22 in autumn.
	October	13	
	November	6	
	December	6	25 in winter.
	Total	95	

The difference between the frequence in summer and winter is so small, and the numbers are so equally scattered over the entire year, that it follows that madness occurs in dogs with almost equal frequence at all seasons and in each month.

The cases that were caused by bites of wolves presented the following order of frequence :—

In Wolves.	In January	1	wolf inflicted the bite that caused hydrophobia.
	February	2	
	June	1	
	July	6	
	October	1	
	December	1	
		12	

While in the cases that were caused by wounds from cats, the animals that inflicted the bites :—

In Cats.	In January	1
	March	1
	June	2
	July	3
		7

The bites were caused by two foxes, one in May and one in August. Hence, if it be true that animals become more frequently affected with spontaneous madness in one month than in another, it is either July, June, or October, and of the seasons it is in summer that most cases occur.

LECTURE II.

Gentlemen,—The theories that have been put forward to account for the causes of spontaneous madness in animals have been nearly as numerous as the authors who have considered this subject. Many other theories are given in "Plocquet, Bib. Med.," and in the various monographs: but there can be no excuse for extending or repeating this long list of errors and fanciful conjectures, by suggesting any theory of its causation that is not based on pathological and chemical investigations made on the bodies of animals that have been affected with this disease; and as the consideration of the affection in animals does not, except when unavoidable, form part of those lectures, it becomes more important to inquire, What are the causes of hydrophobia?

From the earliest period at which the connexion was known to exist between the disease in animals and man, it was believed to arise from a poison placed in a wound caused by the bite of an enraged animal, and although Aurelianus considered that inspiring the breath of a mad dog could cause the disease in man, and it is stated in the "Talmud," that contact with the skin of the animal, or with anything he had rubbed against, is sufficient to impart the disease; still, the belief in a subtle poison passing from the animal to the individual was never doubted, and no author until recently denied that it was most frequently caused by a bite.

M. Bosquillion is the chief representative of those, who, in modern times, asserted, that hydrophobia resulted from terror, was not the result of the inoculation of a poison, and could only be considered as symptomatic of a highly excited state of the nervous system produced by a violent mental impression.

The last author who has supported this idea is M. Bellanger, who states, that it is a nervous affection having its seat in the constrictors of the glottis, that it is always the result of a moral cause—namely, terror,—and it has been brought forward in proof of this opinion, that it has never occurred in infants or idiots. In order to refute this theory, it is only necessary to refer to the regular and undeviating character of the symptoms, to the fact, that women do not appear to be more liable to the disease than men, as the latter are attacked in the proportion of three to one of the former. As to infants being exempt from the disease, it will be found that the disease has attacked and destroyed a child aged two and a half years, this being the earliest age at which an example of this affection has been recorded, and it is almost unnecessary to observe, that still younger infants are almost entirely removed from the attacks of dogs, and the same observation applies to idiots.

An objection of a more reasonable character has been made by Percival, Testor, and lastly by Bruckmüller, to the effect, that hydrophobia is a form of tetanus, and not a disease *per se*.

It must be evident to those acquainted with the phenomena of tetanus, that it differs from hydrophobia in the following respects :—

1st. It results from injuries of the most varied character.

2nd. The effects follow in a very short space of time, a week seldom if ever elapsing between the injury and the development of the symptoms, while the shortest interval between the bite and the first symptom of hydrophobia was 12 days, the longest 334 days, and the average 61 days 18 hours.

3rd. That anxiety, horror, dyspnœa, or convulsions at the sight of fluids form no part of the symptoms included under the term tetanus.

4th. That in tetanus some of the muscles are often in a state of continuous rigidity, and that the convulsions occur at much shorter intervals than in cases of hydrophobia.

5th. That delirium is a very rare symptom in tetanus, and a frequent one in hydrophobia, occurring 80 times in 120 cases.

6th. That in tetanus the secretion of saliva is never increased.

7th. That the muscles of the lower jaw are in tetanus frequently in a state of continued tension.

8th. Opisthotonos or emprosthotonos often terminates the case.

9th. Tetanus is not necessarily fatal, while it will be seen, as hereafter shown, that hydrophobia, when once developed, leaves no hope of saving the patient.

These differences are sufficient to justify hydrophobia being considered to be a disease distinct from tetanus in its cause, symptoms, and treatment. Yet, in a practical or scientific point of view, this objection to the specific character of hydrophobia is of but little importance, as it neither tends to explain its occurrence, treatment, nor pathology; no one doubts that death has resulted from a disease connected with, and owing its origin to, the bite of a dog, hence it matters little what name is applied to the affection by which death is produced—call it tetanus, hydrophobia, or any one of a legion of medical terms; measures should be taken to prevent its occurrence, its symptoms should be carefully considered, its pathological appearances noted, the history of its treatment written, the success that has followed the use of remedies investigated, and, if it be found that the therapeutical agents hitherto used have been either most frequently or invariably ineffectual, it becomes our duty to consider what new line of practice should be adopted.

While, then, it is our opinion that the disease resulting from the bite of a rabid animal is the effect of a poison inoculated at the time of the bite, which produces a disease as distinct from all others, as the symptoms produced by the variolic or arsenious poisons, we enter on the consideration of its symptoms regardless of, whether you believe it to be a specific disease, or only a variety of some other affection, be that called tetanus or any other name among the many that form a medical nomenclature, which, without embodying or conveying any definite idea of its cause, serve to transmit from mind to mind a general conception of the symptoms, treatment, and pathological anatomy of one of the ills to which flesh is heir.

What, then, are the symptoms of hydrophobia?

Authors have hitherto described this disease from the phenomena that presented themselves in the very limited number of cases that came under their own observation, and as it is an affection fortunately rare, their observations must necessarily have been more or less confined to a very narrow circle of cases. Dr. Holland, in collecting the notes from which these lectures are compiled, consulted no less than 393 monographs, besides an immense number of reports in various journals; and in presenting you with a review of 120 cases thus collected, you are furnished with a larger basis for argument and deduction than has been hitherto offered to the profession, or than could possibly come under the notice of any one of its members.

The period from the bite to the death has been divided into three stages:—

1st. The period of incubation.

This includes the time elapsing between the occurrence of the bite and the first symptom, and the shortest interval on record is 12, while the longest was 334 days; and an average of the intervals that occurred in the entire 120 cases gives 61 days and 18 hours as the medium duration of the period of incubation.

Authors reckon the first stage, from the occurrence of the first symptom to the time at which the horror of liquids presented itself. The propriety of making this division will be presently considered; but presuming, for the moment, that it is correct so to subdivide the disease, the symptoms in this stage are,—once in every four cases, pain in the wound and adjacent parts, which become inflamed or redder than natural; eight in about every twelve cases present—shiverings, sadness, anxiety, sleepiness, sighing or loss of appetite; while in the remaining four (of these twelve cases), pain in the wound would have occurred *once* as the only symptom of this stage; and in the still remaining three cases, horror of liquids would have been the first deviation from health. Hence, *the first stage would have been entirely absent in one out of every four cases.* It is therefore evident that the division, made by authors, of a first and second stage after the occurrence of the first symptom, *is purely artificial and not supported by fact.*

There exists, then, but two periods in this disease:—first, that of incubation, which has already been considered; and second, the *period of development*, including all the phenomena occurring and time elapsing between the first symptom and the death.

The development of the disease is marked, as has been just stated, by pain in the wound; this occurs once in every four cases, or the parts become inflamed or redder than usual once in every twelve, while this symptom is altogether absent, the cicatrices remaining perfectly healthy in more than a third of all cases; to this follows shiverings, sadness, anxiety, sleepiness, sighing, or loss of appetite twice in every three cases; then horror at the sight, sound, or mention of fluids; or, in extreme cases, of anything connected with them, inability to attempt, or incapability of, swallowing fluids, though the individual endeavours to take them, with occasional difficulty in taking solids, occurs almost invariably; as, in one case, in which the patient had not any horror of liquids, could even plunge her hands and face into water and keep water in the mouth without difficulty, yet it was impossible for her to swallow it. Hence, a case cannot be considered to come under the term hydrophobia, or to result from the bite of a rabid animal, in which the patient had neither horror of nor difficulty in swallowing fluids. The first consciousness of horror of fluids, or of difficulty in swallowing, has often occurred on the patients endeavouring to satisfy an unusually severe thirst, which latter became a marked symptom in eight of every twenty-one cases; to this, spasm of the muscles of the throat and occasionally of the face, followed four times in every fifteen cases. Nausea or vomiting occurred in three of every seven cases; while hurried respiration, oppression, dyspnœa, or suffocative attacks following the sight of fluids, or attempts to swallow, and often occurring even spontaneously, formed a symptom in two of every three cases; with a brilliant, wild, or haggard expression of the eyes presenting itself seven times in every eighteen cases; general convulsions, alterations in hearing, feeling, and vision occurred frequently, all about the same time, in the proportion of seven to every eight cases of the first; one in six of the second; seven in fifteen of the third, and five in eleven cases of the last mentioned symptom. The saliva begins to be secreted in increased quantity at or about the time when these phenomena are well developed, and pours from the mouth, or is repeatedly spat out, in five out of every six cases; delirium occurs about the same time eight times in every twelve, and soon assumes a more or less furious character, in the proportion of three to these twelve cases. The pupils became dilated five times in sixteen; contracted once in every thirty; eyes injected once in twenty; imperfect vision once, and total loss of vision once in the 120 cases. Lastly, alteration of the sexual desires, as evinced by priapism, ejection of semen, and once by the lustful character of the delirium, occurred once in every eight cases; when a convulsion of a more protracted and terrific character than any of the former, producing asphyxia nine times in thirty-seven cases; either that or collapse once in every thirty; or coma once in forty cases, terminated a scene at which Medicine can do naught but deplore her weakness and lament that she is unable to check the course of a disease which leads with rapid strides to the grave. The following calculations are deducible from the general summary of the 120 cases :—

1st. The shortest interval between the bite and the first symptom was 12 days; the longest 33½ days; the average duration of this period or that of incubation is 61 days 18 hours.

2nd. The shortest interval between the bite and the death was 14 days 18 hours; the longest 335½ days; the average 63 days, 17 hours, and 12 minutes.

3rd. The least number of hours from the occurrence of the first symptom to death is 18 hours; the greatest interval 201 hours, and the average duration of the symptoms is 70 hours 48 minutes.

Such are the symptoms of hydrophobia, such their frequence and probable order of occurrence.

The inquiry, as to whether *all* the symptoms of hydrophobia can occur and proceed to a fatal termination independent of the bite of any animal, is one of the greatest importance in a scientific, practical, and sanitary point of view, involving as it does the questions of—Whether the same disease can arise spontaneously in man and animals? Whether the treatment of this form and of that resulting from a bite should be the same? and finally, if the sanitary measures, taken to preserve man from being bitten, will be to him a guarantee from hydrophobia?

In order to determine these questions, most of the cases recorded in English, French, and German, have been carefully studied, and from among a heap of the incorrect and doubtful, the following cases have been selected, as they present a combination of symptoms, such as on reading the reports again and again are found to be the symptoms which occur in cases of true inoculated hydrophobia. In order to prevent those lectures from being a mere wearisome series of cases taken from the different monographs, we purpose giving, and that very briefly, only such cases as have not been referred to by others.

Case 1.—A soldier, who had never been bitten by any animal, went, while in a profuse perspiration, into a river, and remained for an hour and a half in the water. He was seized with shivering, feverishness, &c. On the next day the symptoms of hydrophobia appeared, and death followed in twenty-three hours.

To this we add the following example, as the cause was somewhat similar :—

Case 2.—A boy, aged 17, had cold water poured on him by his fellow servants while he was sleeping, convulsions followed almost immediately, and for the three succeeding weeks he had a slight dread of water, which finally became so prominent a symptom that he was admitted into hospital. He then complained of headache, anxiety, a burning sensation in the throat, urgent thirst, horror of water, inability to endure the light, and on obliging him to take fluids he was seized with convulsions. Violent delirium followed, saliva poured from the mouth, and death terminated his sufferings fifty-four hours after his admission to hospital, while an intermission occurred between the twentieth and thirtieth hours after admission. At the autopsy, the brain and its membranes, with the entire of the cord, were injected and inflamed.

Case 3.—Patient, a confirmed brandy drinker, had never been, either to his or his friends' knowledge, bitten by any animal. There was no mark of a bite on any part of his body, yet he presented all the symptoms of confirmed hydrophobia, and died. It is interesting to observe that he stated that, while in Italy, he had been seized with the same symptoms as those under which he laboured when he applied for relief, that in the first attack they passed off after lasting three hours, and on both occasions the symptoms followed his having taken an unusually large amount of drink.

Case 4.—Boerhaave gives the case of a man who, having drank a large quantity of brandy, and afterwards sat with his head uncovered in the sun, was seized with fever, accompanied by horror of water, and died on the third day after.

Case 5.—A soldier drank at a draught a pint of gin (Wachholderbranntwein), and was suddenly seized with the symptoms of hydrophobia, of which he died.

Case 6.—A young man, affected with syphilis, was ordered Plummer's pills, which, every time they were repeated, caused feverishness, pain in chest, &c.; finally, the mercury was discontinued and the ulcers healed, then the pain in the chest returned, accompanied by priapism and horror of water, with complete inability to swallow fluids, extreme anxiety caused by currents of air, and later, convulsions, in one of which he died.

Case 7.—A case in most respects similar to the above is given in the same volume.

Case 8.—A man, aged 48 years, became ill without any particular cause. He had never been bitten by any animal, yet he suffered from horror of fluids, inability to drink, delirium, convulsions, saliva pouring from the mouth. Death followed on the fifth day from first symptom. The pathological appearances were—Slight injection of the membranes of the brain; the cerebellum softened to a jelly, but not congested; annular protuberances and rachidian bulbs also softened, but not so much as the cerebellum; *blood not coagulated;* slight redness of the pharynx; base of tongue injected; papillæ prominent; no change in the œsophagus.

Case 9.—This case is given by the same observer (M.

Vautier) as the last, and is almost a repetition of it, both as regards its symptoms and pathological appearances.

All these and similar cases admit of the objection, that the persons may have been bitten without either they or their friends being aware of, or they may have forgotten it, while the fear of being destroyed by suffocation or poison may have induced them to deny that anything occurred which would lead the attendants to suspect that they laboured under hydrophobia, and this supposition is confirmed by the cases on record, in which the friends admitted that the deceased had been bitten by a dog, although during his illness they had most strenuously denied it. Still, with the statements of cases before us, we cannot avoid the conclusions—

1st. That symptoms in all respects, except as regards the causes, similar to those of inoculated hydrophobia, occur in the human subject totally unconnected with the bite of a dog.

2nd. That such cases should in all probability be subjected to the same treatment as if caused by a bite, excepting, of course, the local treatment applied to the wound in the latter case.

3rd. That these cases are of exceedingly rare occurrence, and that their cause and pathological anatomy is unknown.

Does horror of water occur as a symptom in diseases not caused by the bite of any animal?

Horror of the sight, sound, or mention of anything relating to fluids with inability to swallow liquids occurs in cases that have no connexion whatever with the bite of an animal, and is in such cases unaccompanied by the other symptoms that are essential to constitute the series of phenomena to which the name hydrophobia is applied. It would lead too far beyond the immediate subject of this lecture were we to enter into a consideration of the causes of this symptom in such cases as those now under observation; such remarks would be, from the imperfect state of our knowledge, of necessity theoretical, vague, and contrary to the accurate and positive character, which it is our endeavour to give these lectures. We shall, therefore, confine ourselves to a concise description of the circumstances under which this symptom has occurred, referring those who are interested in such investigations to the cases as they are contained in the various journals.

Horror of, and inability to drink, water has occurred under each of the following circumstances:—

1st. After great heat following excessive exercise, as in the case of a peasant who was suddenly seized with this symptom after walking a long distance during the heat of summer.

2nd. After a severe fall or blow on the head, as in the case of the latter accident, followed by encephalitis.

3rd. After drinking cold water while the individual was in a great heat.

4th. After an attack of epilepsy, as was observed by Massa in two of his servants. M. Brieu (fils) made a similar observation on a soldier who during two months suffered from intense headache followed by epilepsy.

5th. Occurring during the course of malignant and putrid fevers, an example of which is given by D. Bonafos.

6th. Occurring in peripneumonia.

7th. Occurring during or immediately preceding the course of an attack of acute articular rheumatism, an example of which is given by Dr. von Basedow in the case of an able-bodied man who suffered from convulsions, spasm of the muscles of the face, horror of and inability to swallow fluids, which symptoms lasted twenty-four hours and ended in an attack of rheumatic fever; and M. Valliex records a similar case that commenced during the course of a very acute rheumatic attack.

8th. In inflammation of the stomach, an example of which has been recorded by Dr. Innes.

9th. During an attack of peritonitis.

10th. In œsophagitis ; this is recorded to have occurred in but one case, reported by Dr. Pfeufer de Bamberg.

11th. Occurring during melancholia.

12th. In hysteria; horror of, and inability to swallow, water is a sufficiently frequent symptom, which passes off with the hysterical paroxysm.

13th. During severe attacks of palpitation of the heart.

14th. Resulting from the bite of a man, of which the following is an interesting and rare example:—A young man, in a moment of intense passion, while entreating his former mistress to allow him to renew his intimacy with her, bit himself on the middle finger. On the next day he felt pain in the bite and extending up the arm, repeated convulsions followed, with horror of water, and he died on the fourth day from the commencement of his illness.

M. Pouteau has recorded another example of horror of water being caused by the bite of a man.

15th. Resulting from terror, as in the case of a perfectly healthy boy, aged 12 years, upon whom a dog sprang *but did not bite him*, for though the teeth of the animal passed through his boot it did not in the least wound the skin. The boy was so extremely terrified that his body was bent, and he could scarcely reach his home; arrived there, he complained of great pain in the foot, where there was not the least trace of any injury; next morning he had fever with delirium, during which he constantly complained of intense pain in the foot; his ravings were on subjects relating to dogs, and he made a kind of barking noise, total inability to swallow, and horror of water, shuddering convulsion, and furious delirium occurred, followed by death on the eighth day from the time he had been attacked by the dog, who remained in good health. Another and somewhat similar case in which the patient recovered is on record. The following case still further illustrates the effects of terror in producing this symptom:—A man had been bitten by a dog whom he believed to be mad, and suffered for a long time under horror of water, difficulty in swallowing, &c., from which he was not relieved until some months after, when it was proved to him that the dog was not mad, upon which the symptoms disappeared.

16th. Occurring during the treatment or after the sudden cure of scabies, as in a case, given by Dr. Hirz, in which a healthy peasant girl, aged 21, who had been quickly cured of the itch by red precipitate ointment, was attacked with horror of water, &c., although she had never been bitten by any animal. The author considered it to be caused by the eruption having been driven back upon the membranes of the cord, and he placed a long blister along the entire of the spine, while he ordered calomel, strychnine, and sulphur internally, under which treatment the symptoms disappeared in three days.

In a case similar to the above, recorded by Dr. Jeitteles, the itch disappeared suddenly after having been treated by cold baths, &c., and the horror of water continued until an eruption of herpes came out along the spinal column.

17th. Occurring in meningitis with sanguineous effusion, of which the following is an example:—A man, aged 34 years, who had previously enjoyed very good health, was seized, after an almost furious fit of passion, with feverishness and vomiting, followed next day by severe headache, spasm of the muscles of the throat, constant spitting, and horror at the sight of fluids, with complete inability to swallow liquids. Delirium occurred next day, and soon assumed a furious character, during which he died. The post-mortem examination showed that the membranes of the brain were congested; a thin layer of extravasated blood lay on the dura mater at the posterior part of the left hemisphere, with many small plastic exudations lying scattered over the surface of the pia mater, and between it and the dura mater; many bloody points on the cut surface of the brain; a small amount of bloody serum in the ventricles.

18th. Occurring as a symptom of and during pregnancy, as in the well-known case of a woman who, during many months of each pregnancy, was so terrified at the sight of water that she could with difficulty be induced to cross a bridge.

19th. Two cases of maniacal delirium, accompanied by "horror of water;" one died, the other recovered.—*L'Examinateur Médicale*, tome iii., 1842-43, p. 294.

As M. Andry's work, "Sur la Rage," page 19, *et seq.*, and the article "Hydrophobie," in the "Dictionnaire des Sciences Médicale," contain references to other cases illustrative of some of the above conditions, it is unnecessary to repeat them; but it was considered desirable to give the cases just mentioned, as many of the conditions under which horror of water occurs had not been noticed by any author.

LECTURE III.

GENTLEMEN,—There is much more truth than novelty in the observation, that our knowledge of the ætiology, and our chances of founding a rational treatment for any disease, is in direct proportion to the perfection or imperfection of our acquaintance with the pathological conditions that give rise to it, and we can have no better illustration of the truth of this remark, and of the inefficacy of empyrical treatment, than in the subject under consideration.

It would be uselessly occupying space to notice, the already too often repeated, imperfect reports of the pathological appearances of a few isolated cases; it must suffice to refer those who are anxious to become acquainted with the post-mortem appearances, imaginary or real, recorded by numerous observers, to article *Rage*, "Dictionniare des Sciences Médicale," vol. xlvii., page 90, et seq. We shall merely extract the pathological appearances of the disease, as observed by Prof. Dupuy, in the Veterinary School of Alfort, in dogs, horses, sheep, and calves. They were—viz.,

1st. All parts of the brain and lungs engorged with blood.

2nd. Traces of inflammation, more or less marked, i the mucous membrane of the larynx, trachea, bronchi, back of the mouth, œsophagus, stomach, and often of the intestines, uterus, and bladder.

3rd. The air passages filled with thick mucus.

4th. More or less serous fluid in the ventricles, or between the cord and its membranes.

5th. Often an extraordinary redness of the sheaths of the pneumogastric and trisplanchnic nerves, through more or less of their extent, more particularly where they enter the chest; at other times sanguineous infiltration of the cellular tissue around the nerves, causing a brownish discolorization. The straw, stones, &c., that have been found in the stomachs of rabid animals, has been by some ingenious (!) authors considered as the cause of this disease; but these accumulations of indigestible substances are frequently found in the stomach of animals who died of diseases in no way connected with madness. The latest, as well as the most correctly examined cases, are those of Dr. Bruckmüller's, made upon eight dogs, in the Veterinary Institute in Vienna, and in which the pathological appearances were—in the

1*st Case.*—Hyperæmia of all organs; disease of the blood (or hypinosis), consisting in a diminution of fibrine.

2*nd Case.*—Catarrh of the stomach, with hæmorrhagic erosions; catarrh of the small intestines, with infiltration of Peyer's glands, such as is seen in typhoid fevers.

3*rd Case.*—Acute catarrh of the stomach, with hæmorrhagic erosions; hyperæmia of all the parenchymatous organs.

4*th Case.*—Exudative process (Exudation?) on the mucous membrane of the small intestines.

5*th Case.*—Acute catarrh of the entire intestinal tract.

6*th Case.*—Exudative process of the mucous membrane of small intestines, with catarrh of the uro-genital system; hyperæmia of all organs.

7th Case.—Intestinal catarrh with œdema of the brain.

8th Case.—Excessive filling of the stomach with food, and acute catarrh of its mucous membrane.

Thus, it will be observed, that the most constant pathological appearances in canine madness are, acute catarrhal state of the mucous membrane of stomach and intestines, with venous hyperæmia of the other organs. Such being the pathologico-anatomical appearances in animals,—we shall proceed to analyse these recorded in the 120 cases of hydrophobia in the human subject.

The diseased condition that most frequently presented itself was, a highly congested, vascular, or inflamed state of the pharynx, which occurred nineteen times or once in every six cases. We have included under one head the congestion (probably venous), the state of injection (probably arterial), and the inflammation of the pharynx, as it was found impossible to understand from the description given by the recorders of thr cases, whether or not they made any distinction between these three states. Next, in point of frequence, is a similar state of the trachea, bronchi, or lungs, taken either separately or collectively, which presented itself in 18 of the 120 cases; and passing from a mucous membrane to the state of the brain and its serous envelopes, we find they were congested 13 times, or about once in every thirteen cases. Still proceeding in our consideration, in the order of frequence, we return to mucous membranes and the œsophagus, which was highly vascular or inflamed in 12 cases, or 1 in every 10; and descending this tract to the intestines they are reported as having been distended with gas in 10 cases, or 1 in every 12. Congestion of the spinal cord occurred 7 times, or once in every 16 cases; while a condition that has not hitherto been sufficiently dwelt upon—namely, *an unusually fluid state of thé blood—was found in 7 cases;* a congested state of the membranes of the brain, unaccompanied by a similar state of the brain's substance, occurred 6 times; and a congestion of the brain, with a healthy condition of its membranes, also 6 times; while the cardiac end of the stomach presented an inflamed appearance in an equal number of cases, or in the proportion of once in every 20. The larynx was congested, highly vascular, or inflamed 5 times; the intestines in a like state in an equal number of cases, and all the viscera presented a perfectly normal appearance in the proportion of 1 in 24 cases. Such pathological changes as occurred only once, twice, or three times, cannot be considered as in any degree essential to or causation of the most prominent or general symptoms.

The most accurate method of proceeding in order to determine the part which each of these pathological conditions plays in the causation of the symptoms of hydrophobia, appears to be, to divest our minds of the idea that we are treating of a combination of symptoms to which the specific name of hydrophobia has been applied, and to consider, very briefly, what would be the symptoms produced by the following diseased conditions, altogether irrespective of their having had their origin in any accident.

1st. *Venous congestion*, *arterial injection*, *or inflammation of the pharynx.*—The first two of these conditions can, most probably, only produce symptoms dependent on alteration in the quality or quantity of the secretion; but the symptoms of inflammation of the pharynx vary according to the extent of the affection, it is generally accompanied by feverishness, uneasy sensation, at times amounting to pain, in the back of the throat, which is greatly increased by swallowing, yet there is a constant desire to swallow the saliva, which, as the difficulty of swallowing becomes greater, is ultimately spat out, with frequent hawkings—this affection usually lasting only a few days, and, in the great majority of cases, terminates in cure; or the inflammation may pass into suppuration or gangrene, and cause death by the opening of a large vessel, or it may extend downwards and, involving the larynx, cause death by asphyxia. But this slight inflammation of the pharynx is not sufficient to account for the extreme difficulty in swallowing fluids, and the comparative ease with which solids are taken; though, when it occurs, it may by the irritation it produces increase in some degree the difficulty in swallowing, it is not at all essential to the production of the phenomena that constitute the disease called hydrophobia.

2nd. *Venous congestion, arterial injection*, or *inflammation of the trachea, bronchi*, or *lungs*, would produce uneasiness in the throat and chest, cough, feverishness, and expectoration, together with the well-known physical signs. The absence of cough and of many of the indications that would draw particular attention to the chest accounts for the few stethoscopic examinations that have been made in these cases, and when recourse was had to this means of diagnosis, no other abnormal phenomena beyond a few large râles were heard. The absence, then, of the physical signs, coupled with the general characters of the pathological appearances, justifies the conclusion that these conditions occurred immediately before or after death, and therefore, cannot be considered as playing any important part, except it be in the last hours of the disease.

3rd. *Congestion of the brain and its membranes* would be preceded by heaviness of the head, giddiness, tingling in the ears, noises in the head, headache, feverishness, dulness, occasional loss of consciousness, and perhaps paralysis, none of which symptoms were sufficiently marked in the early periods of hydrophobia to justify the supposition that these conditions are of necessary or even frequent occurrence at that time, though the fact of three cases having terminated by coma appears to indicate that it may be one of the ultimate causes of death, and it must have lent its aid in the production of 27 deaths by asphyxia.

4th. *Œsophagus highly vascular and inflamed.*—The symptoms of simple excessive vascularity of the œsophagus, if, indeed, it produces any, are not known; but inflammation of the œsophagus has been carefully studied by M. Mondière, and may be expressed as pain of a burning and tearing character in the lower part of the pharynx, in the throat, epigastrium, and sometimes between the shoulders, occurring at a very early period of the disease, to which follows difficulty in swallowing, varying in intensity in proportion to the degree of the inflammation, and there exists, according to Mondière, in every case of œsophagitis a more or less difficult and abundant expectoration, often accompanied by a guttural cough; deglutition even of fluids is very painful, and at times impossible, which, together with slight fever, agitation, and intense thirst, make up the symptoms of this affection. In the generality of cases the disease does not last longer than 7 or 8 days, and terminates in cure, while, if it proceeds to a fatal termination, death is caused by œdema of the glottis, or by that exceedingly rare affection, gangrene of the œsophagus, or even still less frequently, by rupture of the tube.

As to the possibility of this disease causing horror of water, M. Mondière rests his affirmative opinion on the case reported by Dr. Pfeufer de Bamberg, which, though it began with slight difficulty in swallowing fluids, could not have been mistaken for a case of hydrophobia; and it need scarcely be observed that this isolated case is not sufficient authority for the formation of a general rule.

Are, then, the symptoms of hydrophobia produced by or in any way dependent for their production upon œsophagitis? To determine this point, we shall place the symptoms of hydrophobia and œsophagitis in opposition—viz.,

IN ŒSOPHAGITIS.	IN HYDROPHOBIA.
1st. Pain in the pharnyx, throat, or along the spine, occurs as the earliest and invariable symptom.	1st. Pain in the pharnyx, throat, or along the spine, occurred in 42 out of 120 cases, or about once in every three cases, and not as the earliest symptom.
2nd. The attempt at swallowing solid food causes intense pain, and in aggravated cases, the swallowing of even fluids is accompanied by pain, or may be totally impossible.	2nd. The attempt to swallow fluids, though not generally accompanied by intense pain, causes dyspnœa, convulsions, &c., while solids can be in most cases taken with comparative facility.
3rd. Horror of fluids, reported to have occurred in but *one* case.	3rd. Horror of fluids, the most prominent symptom in 119 out of 120 cases.
4th. The amount of difficulty in swallowing is in direct proportion to the extent and intensity of the pathological appearances found in the œsophagus.	4th. No direct relation exists between the pathological state of the œsophagus, as shown after death, and the intensity of the dysphagia, as the tube was perfectly healthy in 107 of the 120 cases in which this symptom occurred.
5th. Saliva abundantly secreted, expectoration difficult, and the time of the occurrence of these phenomena is not fixed.	5th. Saliva secreted in great quantity, often flowing spontaneously from the mouth, and these symptoms always occurring among the last phenomena.
6th. Urgent thirst in perhaps all cases.	6th. Thirst was urgent in about one-third of the cases.

IN ŒSOPHAGITIS.	IN HYDROPHOBIA.
7th. Average duration of the disease seven days.	7th. Average duration, 70 hours 48 minutes, or nearly three days.
8th. Generally terminating in recovery.	8th. Invariably terminating fatally.
9th. Death caused by œdema of the glottis, gangrene or rupture of the œsophagus.	9th. Death most probably resulting from asphyxia, coma, or collapse; no case on record in which it was caused by either œdema of the glottis, gangrene, or rupture of the œsophagus.

It is evident from this parallel, that the horror of and difficulty in swallowing fluids is not caused by inflammation of the œsophagus, and that hydrophobia is not, as some authors considered, only a form of œsophagitis, and that the number of cases in which inflammation of the œsophagus occurred, if, indeed, it ever existed, appears to have been exceeding few, when compared with the frequent and often probably occasional or cadaveric congestion of its mucous membrane, though it cannot be denied that it may have, by the irritation thus excited, helped to produce spasmodic contractions of the œsophagus, and thereby assisted in the production of dysphagia.

5th. *The intestines were distended by gas about once in every 12 cases.*—And this, though not productive of any of the symptoms of hydrophobia, suggests that in the disease in which it occurs the muscular coat of the intestine has in a degree lost its contractile power, and such accumulation of gas is most frequently connected with some affection of the spinal cord.

6th. *Congestion of the membranes of the spinal cord.*—We are obliged to conclude that this appearance was in most, if not in all 6 cases, in which it is mentioned, a congestion resulting from cadaveric changes; certain it is that symptoms of inflammation of these envelopes have, as far as the 120 cases under consideration are concerned, never presented themselves. We look in vain for the lancinating pain in the back, exasperated by movement, &c., which is one of the most characteristic symptoms of rachidian meningitis.

7th. *Changes in the blood.*—An unusually fluid state of the blood, caused by an alteration in the quantity or quality of its fibrine, is said to occur as a consequence of severe and sudden shocks on the nervous system, as in cases of death from lightning-stroke, &c., it is mentioned to have occurred once in about every sixteen cases, and this alteration probably results in such cases from the direct or indirect action of the poison, but whether it be the cause or the result of a change in the nervous system, particular attention should be paid to the state of the blood in all such autopsies, as further observations may show it to be of frequent occurrence.

The unusually plastic state of the blood that was noticed in one case helps to confirm the opinion that there is some change in the composition of the blood connected with this disease, but it remains for chemistry, microscopy, and pathological anatomy, to test the truth of this opinion. This subject will be again considered in reference to the treatment of this disease.

8th. *Congestion of the membranes of the brain*, of the brain alone, and inflammation of the cardiac extremity of the stomach occurred each 6 times, or once in 20 cases; but it is unnecessary to make any observations on the symptoms they would produce, as the remarks under the heads of congestion of the brain and its membranes apply generally to the two former, and those under congestion or inflammation of the œsophagus to the latter.

9th. *Venous congestion, arterial injection or inflammation of the larynx* generally becomes known by an unpleasant feeling, sometimes amounting to pain in the larynx and a disagreeable sensation each time that cold air enters during inspiration, an alteration in the voice follows almost immediately, which is followed by cough, oppression, and more or less fever, which, after remaining some days, terminates in the great majority of cases in cure.

It is curious to observe that in *none* of the 5 cases in which this state of larynx was observed after death is it mentioned that any alteration in the voice was noticed during life, and, on the other hand, in none of the cases in which alteration of the voice was one of the symptoms, is the pathological appearances of the larynx given.

10th. *Congestion or inflammation of the intestines.*—This condition would give rise to pain in the abdomen, diarrhœa, &c. ; but these symptoms were not present in any case.

11th. As there was no abnormal appearance discovered in 5 cases, it follows that none of the above lesions could have given origin to the symptoms in these cases, or the pathological alterations were overlooked. From this review it must be evident that no one of these lesions would be of itself sufficient to give origin to all the symptoms of hydrophobia ; and as none of them can be considered as a causation, there must be an absence of any one lesion that would justify us in making the pathological diagnosis of hydrophobia.

Let us even proceed further, and suppose that all these diseased states existed in the same individual, and they could produce the sum total of these symptoms, none of which nor altogether are of necessity fatal, and death would occur as the result of the patient's strength yielding, and not as a consequence of any one symptom being in all cases a fatal one; further, many of the symptoms of hydrophobia are not referable to any other lesion, and they cannot be the cause of such symptoms as horror, the sight, sound, or mention of fluids, the hurried and oppressive respiration, often threatening suffocation, especially after attempting to drink, the almost uniform occurrence of convulsions, the extreme agitation, dyspnœa, or convulsions caused by the sight of a brilliant or polished object, the alarm and even convulsions caused by noises, the general exalted sensibility of the entire surface of the body, the priapism and ejection of semen, the extremely copious and involuntary flow of saliva, and the curious intermission of these symptoms for a period varying from 2 to 18 hours.

Having, then, taken as complete and logical a view of the pathological anatomy of hydrophobia as was in our power, we are justified in drawing the following conclusions:—

1st. That no one of the morbid appearances that are stated to have occurred in autopsies made on persons who died of hydrophobia, nor all taken collectively, could produce the symptoms essential to that disease, and that it presents phenomena for which none of these pathological changes can account.

2nd. That hydrophobia can proceed to a fatal termination without leaving in the dead body any trace of diseased change.

3rd. That all the pathological appearances hitherto recorded must be considered as secondary or accidental lesions, to none of which can be assigned the place of *the proximate cause*, which is still unknown.

4th. That from a consideration of the sudden, interrupted, intense, and rapidly fatal character of the symptoms, it appears highly probable that as the blood is the most generally diffused and rapidly circulating medium, it is the receiver of an agent through which the nervous system is acted on by the poison and excited by it to produce the symptoms characteristic of hydrophobia.

5th. Presuming the correctness of the last conclusion, it follows from it that treatment should be directed to remove the altered condition of the blood, and that attention should in all future autopsies be directed to discover the physical, chemical, and microscopical changes occurring in it and in the nervous system.

6th. That if it be necessary to give this disease a nosological order, it should be placed among a series of affections that may be included under the general term of Toxo-Sanguineo-Nervous Diseases.

LECTURE IV.

GENTLEMEN,—Dioscorides remarks, that "no one who has been thoroughly affected with hydrophobia has ever recovered;" and Fothergill, in his "Directions for the Treatment of Persons bitten by Mad Animals," says—"In a disease so swift in its progress, it is of consequence to know what *will not be efficacious;* it compels us, therefore, to look around for other auxiliaries."

The observation of Dioscorides is unfortunately as true to-day as it was eighteen hundred years ago, yet, as there can be but little doubt of the correctness of Fothergill's remark, every effort has been made to collect a complete history of the treatment of this disease, and by so doing, it is hoped that the desire of these lectures will be in some degree accomplished.

Commencing, then, at the earliest period, it was Celsus (who lived at the commencement of our era) that first indicated a treatment, which has been but little, if at all, improved on. Pliny, who lived about the middle of the first century, recommended all kinds of absurdities, such as the liver of the mad dog to be eaten cooked; yet he admitted that the disease had never been cured, and he finally recommends cauterization. Galen repeated some of the errors of Pliny, while he advised scarification and cauterization of the wound, with the use of many remedies, especially treacle, and gave it as his opinion that the application of the saliva of a mad dog applied to the sound skin was sufficient to cause the disease, while Cœlius Aurelianus devoted eight chapters to the discussion of the disease in general, the last of which is on its treatment. He considered it was sufficient to inspire the breath of a mad dog in order to become infected; and from his time to the fifteenth century, a period of 1200 years, little progress was made in the knowledge of this affection. Most of these authors have been consulted, and it is only necessary to mention here Rhazes, who recommended the application of caustics to the wound, followed by the internal use of such remedies as cause the evacuation of black bile, in which he supposed the essence of the disease to exist. Avicennus treated it with cantharides, and observes that, when the urine was passed dark-coloured, and containing pieces of flesh, the cure was proceeding, but it was not completed until these portions of flesh (the coagula) assumed the form of animals, and particularly *that of little dogs.* At the close of the thirteenth century, Actuarius made some observations on this disease ; he considered that large wounds were less dangerous than small ; he recommended the wound to be dilated, to encourage the bleeding by using the cupping-glasses, and finally by the use of the hot iron.

We now proceed to review some of the remedial agents used in the cure of this formidable disease, and in doing so, if you look at the syllabus in your possession, you will see that we have first to consider "Plants, vegetables, woods, barks, either solid or in infusion." Under this heading we have collected no less than 228 different vegetable substances, which have from time to time been used, but we shall not try your patience by enumerating them all; it will answer our purpose sufficiently to call attention to those that appear to have been looked on as more important than others—abyssum, or mad wort, almonds. Anchusa officinalis used, in 1817, sweet apples. On the authority of Bo naventura it is stated that the root of balaustrium, storax, cypress nuts, orchanet salt, soot, olive oil, and wine formed the receipt which was found in the possession of Cardinal Richelieu. Belladonna was spoken of as an internal application by Apulius, but Pliny was the first who used it, and it was first tried in hydrophobia by Turguet of Mayerne; he afterwards published a monograph on the subject, and it is interesting to observe that, medicine is indebted to a workman in a mine having communicated the secret of its being a specific in hydrophobia to Mürich's father in 1728. He used the powder of the leaves in doses of from one to fourteen grains as a prophylactic; he also records cases where the disease, though fully developed, was cured by its use. Other authors mention these facts, but we are inclined to doubt that the cases were pure hydrophobia. Beet-root, box-leaves, cabbage, camphor, cucumbers were used much in Abyssinia. Black currants, digitalis, euphorbia cypasias, ℈ii of the dried root every hour. Marochetti says the Russians use the root of the genista sentoria; but, when tried in hydrophobia, was no use. Ranunculus Flammula used internally, and as a poultice, in Greece, to the wounded part, rose-leaves, ergot of rye. Thacker recommended a scruple of it as a prophylactic, and when the disease became developed, he gave 180 grains!!! of the ergot, with 240 grains (?) of calomel, in one dose.

Our next division is, "Alkaloids, extracts, oils, &c., derived from the vegetable kingdom and used internally," of which we have twenty-eight on our list; amongst the most prominent are atropia, asafœtida, aquæ lauro cerasi, elaterium, gamboge, nicotina, opium, of which 180 grains were given without effect. Croton oil given until seventeen or eighteen rice-water stools were produced. Quinine: Chonski gave two drachms every second hour, and 240 grains in one dose.

Under the head of "Acids, alkalies, salts, bases, simple substances taken internally," we have collected no less a number than forty-six, which have been used from time to time. Antimony, alum, arsenic, copper-filings, iodine, lead, mercury, which has been greatly lauded by some authorities. Ice in the form of gargle, prussic acid, given until symptoms of poisoning set in; phosphorus in one-quarter grain doses, with one grain of belladonna; inhalation of oxygen gas; sulphuric acid, of which one pound was taken in twenty days; nitrate of silver; tartar emetic. These are some few out of the forty-six agents which we have placed under the above heading.

In this enlightened age, it will be looked on as foolish on my part, to call your attention to the mass of animal substances that have been used internally in hydrophobia; yet I imagine this course would not be complete did not I bring before you at least some of the nauseous doses which the poor patients were doomed to swallow. For instance, I find pounded ants, badger soup, the excrement of a calf, cock to be eaten with cresses, the brains and comb of a cock, soup of a cuckoo, the eyes of a crab, coral—rather indigestible, I should say—the blood of a duck, blood of a mad dog—his excrement purified, his liver, the worm under his tongue, his urine, &c.; flies, liver of the male goat, half a cupful of hen's blood, with wine (the best part of it), at first once a day, and then once a week; horse's dung, menstrual human blood, tail of a shrew mouse, shells of the male oyster, flesh of a unicorn!!!

We will now pass from these and take a glance at some of the animal substances that our learned ancestors applied to the wounded part. Hair, skins of various animals, saliva, urine—and this naturally brings us to the consideration of the "Operations, lotions, caustics, baths, ointments applied to the wounded part," amongst which, we have such a mass of applications, that we can merely take a glance at a few of them. For instance, acetic acid, chlorine water, fluoric acid, actual cautery, amputation—an arm was amputated for a bite on the hand that occurred seven weeks before, though all the symptoms of hydrophobia had existed for thirty hours; patient died six hours after the operation. Cupping over the bite: nerves near the bite destroyed; excision of the bitten part; leeches; ligature between the wound and heart; caustic potash; half a drachm to two ounces of water as a lotion; sulphuric acid; boiling water.

Our last division of remedies is, "Operations and remedial agents applied to the system in general; or, to a part of it far removed from the seat of original injury." Ether, first used in Malta by Mr. Wells in 1847, and in the same year M. Villieres proposed its use in this disease. Bathing, in either salt or fresh water; vapour baths, the patient to remain one hour in the bath, to drink a pint of decoction of sarsaparilla, and to use mercurial friction to the wound, this treatment to be continued three times a week for three months: bleeding from feet, jugular vein, temporal artery.

Chloroform.—Dr. Hartshorne was the first who applied chloroform to the treatment of hydrophobia in 1848 (see *American Medical Journal*, 1848, vol. xvi. p. 339). He used at the same time aconite to the throat, made the patient inhale ether, and gave opiate enemata. But Dr. Coale was the first who caused it to be inhaled by a boy, aged seven years, whom he believed to be suffering from hydrophobia; the case terminated fatally, but it was evidently not an example of this disease (*American Medical Journal*, vol. xvii. p. 30.) In the same volume of this journal, p. 294, is a paper by Dr. Jackson on this subject, containing two cases—one by Dr. Peppers, the other by the author—in which chloroform was used; but these cases do not admit of being used in favour of the treatment by chloroform, as Dr. Jackson's was evidently not an example of this disease, and the evidence that has been brought forward relative to the utility of this treatment goes no further than to render it highly probable that the intensity of the convulsive paroxysms may be thereby somewhat diminished, and it should be used with the intent of lessening the sufferings without any hope of effecting the cure through its action, and its administration in such cases requires particular attention, as the convulsions and dyspnœa have been so very much increased by its too concentrated use as to oblige it to be discontinued.

The only case of hydrophobia that ever came under my notice was in this hospital. Chloroform was administered, and the patient, a fine boy, died under its administration. So strong was the impression left on my mind from the result of the case that, were there no other remedy to be used, I would not *dare* give it in this fearful affection; and I am strengthened in my views on the use of chloroform by our Professor of Anatomy, Dr. Corbett, who on that occasion strenuously opposed its being used, and proposed tracheotomy. I believe chloroform may be used with the greatest caution in tetanus, certainly not in hydrophobia.

Laryngotomy, Music, Pressure on the Carotids, Tracheotomy.—This operation was proposed so far back as 1626, and was again spoken of by Marshall Hall. Had I a case again under my care, either that or transfusion would be my plan of treatment.

Having noticed, as completely as our researches and time admit, the different kinds of treatment which may and have been multiplied almost indefinitely, by combining one with the other, it only remains for us to glance at such agents and compounds as could not be included under any of the headings enumerated. For this purpose we shall enumerate the most remarkable supposed to be specifics, as a complete description of them would extend this lecture beyond reasonable limits. One of the most remarkable was the Ormskirk remedy—so called from the name of a family in Lancashire, among whom it was long kept as a secret—it was of the following composition:—℞ Pulveris Cretæ ℥ss., Boli Armenæ ʒiij., Aluminis grs. x. Pulveris Enulæ Campanæ ʒj., Olei Anisi guttæ v., M., This is according to the description given by Heysham, and long afterwards by Parry, who gives examples of its having failed to cure the disease. It is also recommended by Baumer.

The powder of Tonquin, or of George Cobb, consisted of sixteen grains of musk, with twenty grains of cinnabar, to be given every four hours, or even every hour if the disease was far advanced.

The powder of Palmarus is one, if not the most ancient, of these compounds, and was formed of the leaves of rue, verain, sage, plantain, polypody, wormwood, mint balm, mint betony, hypericum, and lesser centaury, of each a handful, beaten into powder and mixed, and a drachm of the powder taken with sugar in wine, cider, &c., every morning three hours before eating.

The Marochettian treatment consisted in the opening on the 9th day after the bite certain pustules that were situated on either side of the frenum of the tongue. This was recommended to be done with a red-hot wire, and afterwards gentian was administered internally. The Salic treatment, which is still the official remedy in the entire Austrian States, consists in opening the ranine veins, and administering fresh gentiana cruciata root internally.

It would be easy for us to add several other remedies, of which we have before us many examples, from the works of Portal, St. Martin, &c.; but it would only serve to occupy our now too nearly expired time. We therefore hasten on to the remedies connected with the religious opinions of the people of all countries.

The name of St. Hubertus appears to have been the great scare-crow of the evil spirit who caused this disease in both man and dog, and not only was this power possessed by the saint in *propria persona*, but his son's son's grandson, his keys, and even his stool! possessed similar properties; but to begin with the saint, who, a hunter by profession, led a not too strictly moral life, was first converted by a miracle, and received direct from Heaven a key that was all powerful to heal persons who were bitten by rabid animals. After Hubert's death the title of Saint was prefixed to his name, and, as generally occurs in such cases, immediately after his decease his virtues became so suddenly known and generally appreciated, that a cloister was erected and his body interred there, as on this later act appears to depend the worldly prosperity of such institutions. Here lay St. Hubertus, and his key found itself in the keeping of those who call him their patron, and was used in the following manner :—The person who had been bitten first confessed and received absolution, after which the following prayer was said : —"Oremus. Omnipotens sempiterne Deus, qui beati et gloriosi Confessoris tui et Pontificis Huberti meritis, sæpe diversos morbos et languores curasti, concede perpetuo ut cuncti, qui ejus implorant auxilium ab infestione dæmonum et subitaneo morte et omni rabie, morbo et periculo corporis et animæ juguter ejus intercessione liberati per Christum dominum nostrum. Amen." After the repetition of this prayer the key was heated in a fire, and. while heating, the patient repeated the following prayer :—" Deus qui beatum Hubertum Confessorem tuum atque Pontificem ad viam veritatis mirabiliter conversisti et plurimos dæmoniacos mentis raptos et rabie infectos ipsis periculis restituisti tribus quæsumus ut ejusdem patrocinio famulas (famula) læsus (læsa) abomini intoxicatione ac demonium incurcio aberata et sana tibi mente et corpore famuletur, per dominum nostrum Jesum Christum. Amen." The bitten part was then cauterized with the key, and if it was considered desirable, to increase the security against the consequences of this present as well as of all future injuries, the man or animal, for it could be used to either, was burnt *under the tongue* and on the forehead with the round or handle part of the key. Thus the merit of having originated sublingual cauterization does not belong to Marochetti, having been for centuries before he was born practised in the name and with the key of St. Hubertus.

But the virtues of the saint were, by some inexplicable means, transmitted to his descendants, and in the parish of Senlis there lived one of his descendants, a peasant, who, by touching those bitten, secured to them immunity from the disease for 101 years. But in order to keep a constant supply of the curative agent always at hand, it was discovered (how is not mentioned) that St. Hubert's *stool* was a preservative against hydrophobia ; and it is an object of no small importance to a cloister in a forest near Luxembourg, where this stool probably is still to be found, and, we can confidently assert, could be used to-day with as much efficacy as when first discovered. To protect those who were bitten, the smallest portion of it was placed into a small wound made upon the forehead, and retained there by a bandage, while the patient must not eat hot food, nor wash or comb himself for twenty-four hours, after which time he is protected from hydrophobia ; and though many thousand splinters have been taken from this stool, it has in no wise diminished. It would be presumptuous to discuss even for a moment the efficacy of these remedies, regarding which it is only necessary to observe that it forms a striking example of the irresistible character of an argument on *a posteriori* principles !

The idea of some peculiar virtue residing in the keys of churches caused them to be used as cauterizing irons ; and the keys of the Eglise St. Rock, those of St. Pierre, &c., at Paris, were often worn out from their having been repeatedly used, and the keys of the temple of the Holy Bellini appears to have been held in great veneration, as it forms the subject of a dissertation by Camerarius.

Passing from these ceremonies, we find that charms and incantations have played their part in the treatment of this disease, and an incantation practised very extensively by a peasant in West Prussia, consisted of the words Pax, Max, Imax, written with a piece of wood three times on a slice of buttered bread, and then eaten by the person to be cured !

The most curious of these charms, and one much relied on in Russia, consisted in the following form of words and signs, scratched also on buttered bread, and given to the bitten individual or animal to eat. The incantation ran thus:—

+ Iryon + Syryon + Kiryon +
Karyon + Koforyn + Stylida +
Stalitura + Kakara + Idota +
Strydota + Syon + Bryan +
et + Deus + Meus +.

What language this may be is beyond our means of ascertaining, but it is not Russian, and only the last three words are Latin.

Desault mentions, on the authority of Skenchius, that the church of St. Vittau, in Poüille, was very celebrated for the prevention of hydrophobia, the person who applied for relief making the tour of the church every night for three weeks, singing the following hymn:—

Alme Vithe Pellicane,
Oram qui tenes Apulam,
Litusque Pollignanicum,
Irasque canum mitigas;
Tu Sancte rabiem asperam
Rectusque canis luridos
Tu sævam prohibe luem,
I procul hinc rabies
Procul hinc furor omnis abeste.

It is a relief to turn from this long list of empirical remedies to propositions for treatment founded on principles more or less logical. Hufeland, in his journal, proposed that the disease should be transmitted by inoculation through two or three generations, thereby its virulence weakened, and then in a mild form generally inoculated; but most unanswerable objections suggest themselves to the mind of any one reading this proposal. First, the generations into whom it was inoculated would either die from the inoculation succeeding, or it would take no effect whatever; thus it is impossible to produce a modified virus, and even if it was obtained there is no reason to believe it would be sufficient to protect from the unmodified virus that would be constantly arising in dogs, wolves, &c.

The inoculation of scabies has been proposed as a treatment, in the hope of producing some action, irritating or otherwise, which, by producing a tendency to the surface, might interfere with the internal action of the disease; but as Dr. von Pommer, in his admirably written paper on the prophylactic treatment of this affection observes, tartar emetic ointment would be more likely to produce the desired effect; and he gives it as his opinion that any remedy that will prevent, cure, or relieve this disease, must act by producing a dynamico- chemical alteration in the organism of the individual affected, and he considers mercury as the best agent to produce a fever or feverish state of the system, whereby he hoped to effect such a change. If this failed to produce and keep up for six or seven weeks the state of feverish excitement, he recommends that it be alternated with the use of the salts of copper, baryta, gold, saltpetre, &c. Be this treatment successful or otherwise, the greatest praise is due to Dr. von Pommer for having enunciated twenty-seven years ago the principle on which the rational treatment of this disease can alone be discovered. There is probably no disease in which the so-called specifics have had so varied and long-continued and repeated trials, and their failure could not unhappily have been more complete. It is to be regretted that, since 1826, authors have either entirely overlooked or not noticed this principle of Dr. von Pommer's, which contains the idea on which the treatment of this disease must be founded—namely, "that search should be made for agents whereby a positive alteration can be effected in the system, so as to render it incapable of receiving the poison, whereby the poison, if received, may be destroyed, removed, or its effect neutralized." Having this belief constantly in mind, it appears to be most contradictory practice to give mercury to facilitate the absorption or taking into the system of abnormal deposits, and to use the same agent to prevent the absorption of a poison laid on a wound; but we fear to enter on such discussions, as it might lead too far from the immediate subject under consideration.

While investigating this division of the inquiry, it appeared to Dr. Holland that there was something antagonistic between the poison that produced variola and hydrophobia. It is unnecessary to enter into details relative to a long series of observations made on the relative frequence of canine madness in dogs and other animals, with the absence of true variola in the former, and the rarity of it among sheep, &c. Suffice it that he plumed himself on having perhaps discovered a protection from hydrophobia, and he was further strengthened in his opinion by the result of a case which the medical attendant pronounced to be hydrophobia, and in which he inoculated the woman with vaccine in six places, and none of the points of inoculation became inflamed. This case recovered, and though a careful consideration of the symptoms made it quite evident that he had not inoculated a case of hydrophobia, still it rather helped to impress on him the conviction that the variolic and hydrophobic poison were antagonistic, until a case presented itself in which a boy, aged 16 years, who was deeply marked from small-pox, died of hydrophobia. Hence once having had severe small-pox does not protect from hydrophobia. It can, however, do no harm to investigate its action on hydrophobic patients by inoculating them with vaccine matter. However it is fully proved that the syphilitic and hydrophobic poison can, not only exist in the same subject, but there is a case on record in which the disease was communicated by a rabid dog having licked a syphilitic ulcer on the penis. Further, the poison resulting from the bite of the viper can act at the time that hydrophobic poison is actually at the height of its action.

There is, then, no agent at present known whereby the system can be placed under such conditions as will enable it to resist or render it incapable of receiving the poison, and the only means of preventing its occurrence is to enforce a registration of all dogs, to establish in each city an hospital into which persons should be obliged to send their dogs when they became in any way ill, attendance and medicine being charged for in proportion to the amount of income or other tax paid by the owners, so as not to prevent the poor, whose property they protect, from keeping them. To insist that all dogs be invariably muzzled; that each animal has a chain and a number attached to it, placed round the neck by the authorities, *not by the owner*, so fastened that it cannot *at any time* be removed, and that for its removal the persons be most severely punished; that all dogs found in the streets unmuzzled be seized, the owner heavily fined, and the dog given to the hospital for the purposes of experiment; hence the necessity for each dog being numbered, as by referring to the registry his owner can be thereby known; that the owner of any dog who shall escape unmuzzled into the street, bite any one, and death from hydrophobia result, shall be adjudged guilty of *manslaughter*, and punished accordingly.

These propositions may appear most unusually severe. They should be so, as in no other way can the occurrence of this disease be prevented, except by the destruction of the entire race, and even then wolves, cats, and foxes would propogate it, while if but one life was saved by such regulations, it would more than compensate for the expense and trouble necessary to put such regulation in force.

As to the means that should be used after a person has been bitten, we advise immediate and continued washing of the wound in hot water, and, if possible, the application over the part of a wine-glass containing a piece of lighted paper that has, or has not, been soaked in spirits, as this will act as a domestic cupping-glass until medical aid is obtained. In all cases of bites caused by dogs, wolves, cats, or foxes, the parts should, if possible, be deeply and completely excised, and the cut surfaces freely, even brutally, cauterized with one of the mineral acids, caustic potash, chloride of zinc, butter of antimony, nitrate of silver, the actual cautery being that generally used, but a preference should be given to those that are fluid or deliquesce rapidly, as their action is much more evenly diffused over the entire surface than when nitrate of silver or the red iron is used, and in all cases anæsthesia should be first produced by chloroform, as the action of the caustic on the recent and often extensive cut surface often produces a prolonged and even dangerous agony. When the bites are so extensive, or situated in such places as render excision impracticable, the caustic alone should be used. In the event of the bite having been caused by an animal that had bitten others, had been previously ill, or in whom there were other good reasons for expecting madness to have existed, if the bite is situated on a part that may be amputated without endangering life or depriving the individual of a member essential to the attainment of his livelihood ; if, for example, a finger had been bitten, the justifiability of amputation appears to be unquestionable, and should be strongly urged on the patient as the most certain means of obtaining security from this disease.

Among the legion of medicines that have been recommended and used as prophylactics, there is not one in which there appears to be any reason for putting confidence more than another, as they have failed again and again ; but it is true that though excision and caustics have also failed to protect from the disease, either from their not having been applied soon enough, or not used sufficiently freely, hence there can be no reasonable objection to the use of any of the proposed drugs, and of these belladonna, quinine, and medicines of this class, are probably most useful.

When the disease has been developed, the treatment by transfusion of blood appears to be the most rational and likely to succeed. This operation, mentioned by Ravelly in 1696, was practised by Eye of Suffolk, in 1792, who bled a man aged 17, until blood no longer flowed, and then transfused into him the blood of two lambs, and the patient recovered completely. This case is mentioned in the *Historical Magazine*, 1792, page 167, but, unfortunately, Dr. Holland did not succeed in obtaining this journal, and quotes from a notice of it in an article by Friedreich, at page 105, vol. i., of the *Jahrbucher der Philosophish-Medicinischen Gesellschaft zu Wurzburg*, 1828. It is recorded in the *Lancet*, vol. xv., 1829, page 232, on the authority of "Rust's Repertorium," the volume not being mentioned, that Dieffenbach bled a man who was suffering under all the symptoms of hydrophobia to 24 ounces, and

12 ounces of blood were transfused at two different periods; at each injection the pulse rose and became regular, while the fear of liquids seemed to diminish. On the next day 32 ounces of blood were extracted, and 12 ounces slowly transfused without any good effect. On the following day 6 ounces were withdrawn and 5 injected, making in all 62 ounces of blood abstracted at three bleedings, and 29 ounces injected at four transfusions, yet the patient died. Such are the cases in which transfusion has been used, and although we cannot assert that the successful case was one of hydrophobia, and though the other case died perhaps from the operation not having been repeated sufficiently often, or applied when the symptoms were already too far advanced to allow of any therapeutic agent taking effect, still the result of reading and reasoning on this subject had led Dr. Holland to form the deliberate conclusion that should it please Providence to afflict him with this disease, he should have used in his own case what he would recommend in others—namely, extraction of blood until syncope was produced, to be followed by immediate transfusion of nearly a similar quantity of lamb's or sheep's blood, and these operations should be repeated at as short intervals as was consistent with the safety of the patient, the endeavour being to produce, if possible, complete transfusion, so as to have sheep's blood circulating in the individual's vessels, but, as this is probably impracticable, the change should be made as complete as possible by repeated extractions and transfusions, made as soon as the disease was sufficiently developed to enable the physician to declare that the case before him was an example of hydrophobia, as no remedial agent will probably ever be discovered capable of curing the disease after the symptoms have almost brought the patient's life to an end.

We now, gentlemen, have brought our remarks on hydrophobia to a close; imperfect as these remarks have been, we sincerely trust that you have, more or less, derived some benefit from them. We have laid before you the entire literature of the subject, and from that we have drawn certain deductions, that at some period of your lives may be of use; but with all the authorities that we have searched through, with all the mass of remedial agents that we have seen to have been used from the earliest period to the present hour, we must candidly acknowledge to ourselves that, medicine with all her treasured stores, surgery, with all its various appliances, science with all its research, has failed, and that signally, in pointing out to the student of this subject one single ray of hope, as he stands by the bedside of a hydrophobic patient, that he can do anything to save life in this invariably fatal disease.